

We claim:

- 1           1.     An active pixel sensor array sampling system comprising:  
2               a video circuit that generates a video voltage from each one of a group of  
3               pixels; and  
4               a reference circuit that generates a unique reference voltage associated with  
5               each one of the pixels in the group of pixels; wherein the video circuit comprises a  
6               plurality of video amplifiers, each video amplifier being associated with a respective  
7               one of the pixels in the group of pixels, wherein the reference circuit comprises a  
8               single reference amplifier associated with all of the pixels in the group of pixels, and  
9               wherein the reference amplifier samples and holds a unique reference voltage for  
10              each one of the pixels in the group of pixels.
- 1           2.     The system of claim 1 wherein each of the video amplifiers is  
2               associated with all of the pixels in a respective column of pixels.
- 1           3.     The system of claim 1 further comprising a differential amplifier that  
2               generates a differential voltage responsive to the video voltage and the unique  
3               reference voltage associated with each pixel.
- 1           4.     The system of claim 3 wherein the reference amplifier has an output  
2               continuously coupled to the differential amplifier during reading of the video voltage  
3               of each of the video amplifiers.
- 1           5.     An active pixel sensor array sampling circuit that samples a voltage on  
2               each one of a plurality of pixels, the circuit comprising:  
3               a plurality of video circuits, each video circuit generating a video voltage  
4               related to a voltage on a respective one of the pixels as its respective pixel is  
5               sampled; and  
6               a reference circuit that samples a reference voltage as each video voltage is  
7               read from the video circuits.
- 1           6.     The circuit of claim 5 wherein the pixels are arranged in columns and  
2               rows, wherein the reference circuit is associated with all of the pixels of each row of  
3               pixels, and wherein the reference circuit samples and holds a unique reference  
4               voltage as each video voltage of a row of pixels is read.

1           7.     The circuit of claim 6 further comprising a differential amplifier that  
2 provides a differential voltage representing a difference between each read video  
3 voltage and each sampled reference voltage.

1           8.     The circuit system of claim 7 wherein the reference amplifier has an  
2 output continuously coupled to the differential amplifier during the reading of the  
3 video voltages for each row of pixels.

1           9.     The circuit of claim 8 wherein each video amplifier is associated with all  
2 of the pixels of a respective column of pixels.

1           10.    An integrated circuit including an active pixel sensor array sampling  
2 system comprising:  
3           a plurality of video circuits, each video circuit sampling a video voltage from  
4 each one of a group of pixels; and  
5           a reference circuit that samples a unique reference voltage as each video  
6 voltage is read from the video circuits.

1           11.    The integrated circuit of claim 10 further comprising a differential  
2 amplifier that generates a differential voltage responsive to each read video voltage  
3 and its corresponding sampled reference voltage.

1           12.    The integrated circuit of claim 11 wherein the pixels are arranged in  
2 columns and rows and wherein each video circuit is associated with all of the pixels  
3 of a respective column of pixels.

1           13.    A method of sampling a group of active pixels comprising:  
2           sampling a voltage on each pixel to generate a video voltage for each pixel;  
3           serially reading each video voltage; and  
4           sampling a reference voltage as each video voltage is read.

1           14.    The method of claim 13 comprising the further step of generating a  
2 differential voltage from each read video voltage and its associated sampled  
3 reference voltage.

1           15.    The method of claim 14 comprising the further steps of arranging the  
2 pixels in plural groups, and providing a single reference amplifier for all of the groups  
3 of pixels.

- 1            16.    The method of claim 15 wherein the pixels are arranged in columns and
- 2    rows, and wherein each group of pixels is a row of pixels.